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EVOLVING MAGNETIC STRUCTURES AND THE PREDICTION OF CMES: A CASE STUDY

Joan Feynman

Jet Propulsion Laboratory, California Institute of Technology,

Pasadena, California, 91109, U. S. A

In March 1989 a series of CMEs produced a major proton event. The relationship of these CMEs with the evolution of a large-scale, long lasting magnetic activity complex on the sun has been studied. It is known that regions of enhanced magnetic flux are not randomly distributed in solar longitude. Instead enhanced magnetic flux often defines activity complexes that last many solar rotations. We here report on an investigation of the relation of the March series of major flares and CMEs with an activity complex. We find that these events were a stage in the development and evolution of a magnetic structure which began as an activity complex existing at least 3 rotations before the proton event and continued as a major filament channel at least three rotations after the main event. It was also found that the ability to study of the evolution of these long lasting and complex magnetic structures and to predicti major CMEs would be significantly strengthened by observations taken when the region was on the far side of the Sun.

PROTON FLUENCE PREDICTION MODELS

Joan Feynman

Jet Propulsion Laboratory, California Institute of Technology,

Pasadena, California, 91109, U. S. A

Many spacecraft anomalies are caused by positively charged high energy particles impinging on the vehicle and its component parts. Here we review the current knowledge of the interplanetary particle environment in the energy ranges that are most important for these effects. The emphasis is on the particle environment at 1 AU, but the problem of the radial dependence of the fluences is also discussed. State-of-the-art engineering models are briefly described along with comments on the future work required in this field.